

Beyond the Hypervisor: Optimizing Virtualization Management

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
Prepared for ASG Software Solutions

August 2009



IT MANAGEMENT RESEARCH,
INDUSTRY ANALYSIS AND CONSULTING

Table of Contents

Inefficiencies of Virtualization Management	1
Mature Approach to Virtual Systems Management	3
Best Practices in VSM: Capacity, Performance, and Configuration Management	3
Capacity Management	3
Performance Management	4
Configuration Management	5
Integrated Management	5
ASG Approach to Critical VSM Disciplines	6
EMA Perspective	8
About ASG	8

Inefficiencies of Virtualization Management

Enterprise Management Associates (EMA) research shows that virtualization has rapidly become ubiquitous and pervasive. Around 90% of enterprises have already implemented virtualization (79% in production), and 60% for more than 12 months.¹

This explosion has permeated throughout IT, driven by the sheer diversity of most virtualization deployments. A massive majority (98%) are using multiple virtualization platforms, technologies, and vendors – on average 3 to 4 of each, and as many as 20 in total. As a result, in 67% of enterprises, multiple teams (four different teams on average) are responsible for managing virtual systems.

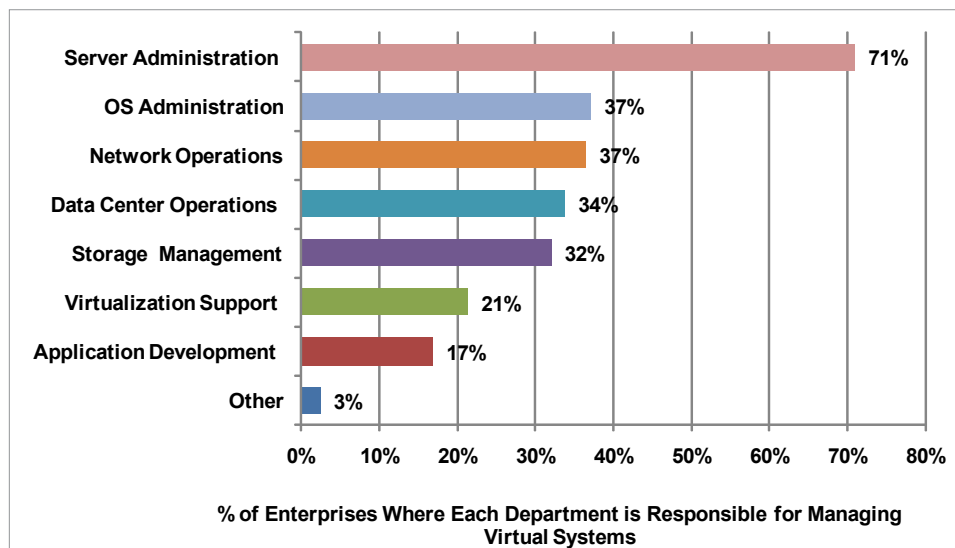


Figure 1: The Multiple Task-Oriented Teams Involved in Managing Virtual Systems

Over time, this pervasive impact will increase, as virtualization project teams are disbanded and management is returned to the usual IT management teams. Only 14% of enterprises intend to maintain a separate virtualization management team for more than 24 months.²

Moreover, with an average of only 25-30% of most enterprise infrastructures currently virtualized, physical infrastructures will remain dominant through at least 2010. Physical and virtual systems will therefore need to work together, and be managed together, to deliver end-to-end business services.

No single team can be experts on all aspects of heterogeneous virtual systems.

No single team can be experts on all aspects of these heterogeneous virtual systems. Many specialists will be required to support this complexity.

¹ See EMA Research Report, *Virtualization and Management: Trends, Forecasts, and Recommendations*, <http://www.enterprisemanagement.com/research/asset.php?id=721>

² See EMA Research Report, *Best Practices in Virtual Systems Management (VSM): Virtualization Metrics and Recommendations for Enterprises*, <http://www.enterprisemanagement.com/research/asset.php?id=1104>

However, most IT infrastructure and operations management has not kept pace with these trends. Only 14% of administrators are using tools that are purpose-built for managing physical and virtual infrastructures. Conversely, 75% are using legacy physical tools with no insight into virtual machines, or virtualization-specific tools – such as VMware vCenter, etc. – with no insight into physical capacity and performance.

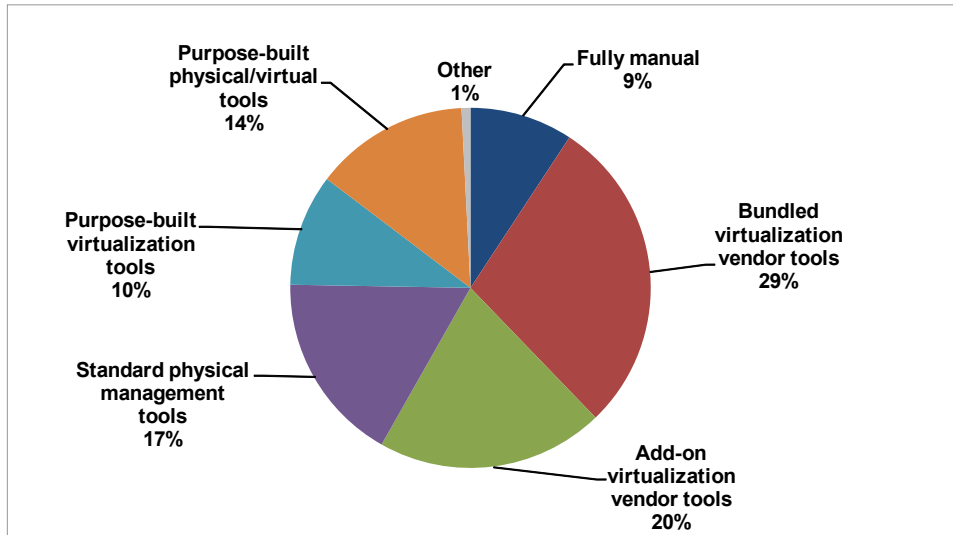


Figure 2: Tools Used to Manage Virtual Systems

These focused ‘virtualization-only’ approaches are beneficial for low-level VM management, but will not scale to fit the need for broad, integrated physical and virtual system management, and so will not satisfy the needs of disparate teams managing these heterogeneous physical and virtual environments.

Moreover, such approaches introduce significant problems. ‘Virtualization management’ teams need access to servers, storage, security, networks, and more, opening up significant security, audit, and compliance risks. A myopic focus on virtualization also misrepresents service and performance, because true quality of service is determined by end-to-end performance – including system performance, application performance, network latency, and end user response times, not just VM resource utilization.

Enterprises need expansive third-party solutions that scale out beyond the virtualization project team, and beyond hypervisor management.

To overcome these challenges and optimize virtualization deployments, enterprises need expansive third-party solutions that scale out beyond the virtualization project team, and beyond hypervisor management, to allow task-oriented departments to manage virtual systems.

Mature Approach to Virtual Systems Management

As organizations increase their virtualization maturity, and return to a focus on business services, rather than virtualization technologies, they must also increase their management maturity. This will entail shifting focus away from a myopic view of managing hypervisors and VMs, and toward a broader view of integrated service management. Tools must cross physical and virtual, host and guest, system and application; they must incorporate mature IT infrastructure and operation management disciplines; and they must provide functionality to support multiple task-oriented groups within IT.

Mature management disciplines correlate directly with measurable improvements

EMA research highlights that adopting mature management disciplines like capacity management, performance monitoring, or configuration management correlates directly with measurable improvements in key performance indicators like Administrator costs, VM density, Admin-to-VM ratios, etc., and best practice outcomes in ROI and other metrics of success.

Of course, management of these environments must also extend beyond just functional and IT management. The imperative to connect IT delivery with business objectives is a consistent drumbeat in almost all IT organizations. Virtualization must therefore also be aligned with current value-added and business-oriented initiatives, such as BSM, ITIL and Service Desk.

Virtualization must therefore also be aligned with current value-added and business-oriented initiatives, such as BSM, ITIL and Service Desk.

This is what EMA considers to be Virtual Systems Management (VSM) – a broad, integrated approach to managing physical and virtual environments, incorporating multiple IT Infrastructure and Operations disciplines, connected to business objectives, as an extension of both low-level virtualization management and mature enterprise systems management.

Best Practices in VSM: Capacity, Performance, and Configuration Management

In EMA research, a number of mature, task-oriented, Infrastructure and Operations management approaches stand out among the VSM disciplines as having a strong positive impact on virtualization KPIs by facilitating day-to-day administration tasks in virtual environments:

Capacity Management

Server consolidation continues to be a leading virtualization objective, with 99% of organizations citing this as a critical or important goal. To achieve higher consolidation ratios and higher server retirement rates, VSM solutions for capacity management are critical.

While the average enterprise runs just 6 VMs per server, the best performing enterprises run 15 or more.

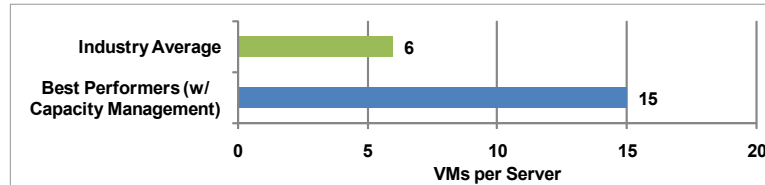


Figure 3: VMs per Server: Best Performers vs. Average

Similarly, while the average enterprise attains just 65% memory utilization, best performers achieve 85%. The best enterprises are able to measurably reduce their data center floor space due to their virtualization initiatives. Best performers in all of these areas are significantly more likely to use Capacity Planning and Management software.

Task-oriented administrators can use capacity management tools to achieve virtualization goals by measuring current and expected resource utilization, matching it accurately to changing and forecast workload requirements, and planning capacity for new workload deployment, ultimately using servers and other resources more efficiently.

Performance Management

Maximizing capacity and utilization is not the only objective for virtualization administrators. It is also vital to maintain or improve end-to-end performance (not just hypervisor resource utilization) within capacity constraints. Indeed, 92% of enterprises rate “Meeting SLAs” as a critical or important virtualization goal.

Best performers in many important KPIs are also more likely to use VSM solutions that measure, manage, and optimize performance.

Best performers in many important KPIs are also more likely to use VSM solutions that measure, manage, and optimize performance. For example, VSM tools for Performance Management are highly correlated with best performers in VM density and floor space reduction (outlined above), and with best performers in Administrator to VM Ratios, who manage 150 or more VMs per administrator, compared to the average of just 77 VMs, saving around \$400 per VM in staffing costs alone.

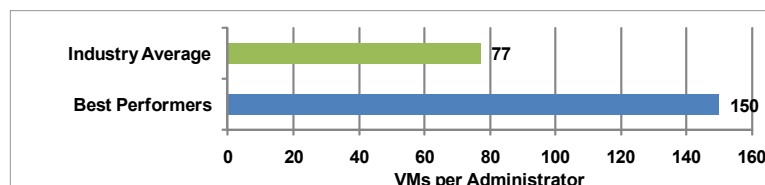


Figure 4: VMs per Administrator: Best Performers vs. Average

Performance management tools allow task-oriented administrators to directly affect virtualization goals, by monitoring performance trends, fine-tuning performance, detecting and remediating service issues, and allocating workloads appropriately to maintain service levels.

Configuration Management

Beyond monitoring outcomes, administrators also need to know what components, workloads, and software are at their disposal to proactively change performance and capacity utilization, requiring visibility and control over software and hardware asset configurations.

VSM tools that provide discovery, inventory, asset, and configuration management information correlate with several important virtualization KPIs. Enterprises with these disciplines are more likely to achieve higher admin to VM ratios, faster VM and application deployment times (8 times faster than average, and up to 240 times faster than physical systems), lower frequency of availability problems, reduced power consumption, and nearly as ten times the average number of servers retired.

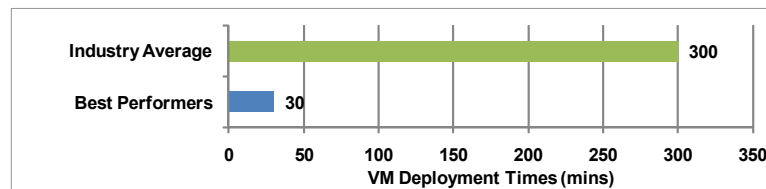


Figure 5: New VM Deployment Times: Best Performers vs. Average

Task-oriented IT administrators can use discovery, inventory, asset, and configuration data to gain insight into resource availability, make better decisions on resource utilization, find spare space and available licenses faster, and improve efficiency of resource utilization and provisioning.

This discipline also contributes to improvements to security and compliance, as it helps to detect and prevent VM sprawl, provide reports for SOX, PCI, and other regulatory audits, and reduce many of the risk issues (like rogue unpatched or malicious VMs) introduced by virtualization.

Integrated Management

Standalone disciplines can work well to achieve specific goals. However, the interconnected nature of capacity, performance, and asset controls means a truly optimized environment requires an interconnected management approach.

A truly optimized environment requires an interconnected management approach.

EMA research shows that this correlates with significant outcomes in measurable virtualization KPIs. Integrated management for physical and virtual systems correlates with higher uptime, better server-to-VM and admin-to-VM ratios, reduced power consumption, and more. Integrated management of multiple virtualization platforms, technologies, and vendors correlates with best practice outcomes in MTTR, recovery/restore success rates, CPU utilization, and more. VSM

tools that align with business objectives correlate with faster VM migration, better admin to VM ratios, faster VM deployment times, and more.

Integration helps task-oriented administrators achieve these results, because fewer people with more targeted skill sets can handle more complex, multi-disciplinary processes – like allocating servers, VMs, software, and storage for a new system deployment; or connecting workloads and performance with business needs when allocating capacity or restoring a failed system. These connection points are not just academic – they satisfy real, daily operational needs, across multiple departments.

ASG Approach to Critical VSM Disciplines

Most virtualization management tools tend to focus on managing low-level virtualization components – such as the ESX server or hardware resource utilization. However, regardless of how well IT manages these layers, the true Quality of Service (QoS) as seen by the end user is substantially determined above these layers – by the guest environment, the application, the network, etc. IT needs sophisticated tools to show the effect that running ‘as a VM’ has on the end users. Without accurately measuring guest environments, administrators are blind to what is really happening to QoS.

ASG is addressing these issues by extending management focus beyond the hypervisor, and providing visibility beyond low-level virtualization components, with its Business Service Portfolio™ (BSP™) Virtualization Management solutions. With multiple disciplines in a tightly integrated solution for heterogeneous virtual systems management, ASG BSP Virtualization Management adds value to existing virtualization-specific investments, as seen in Figure 6.

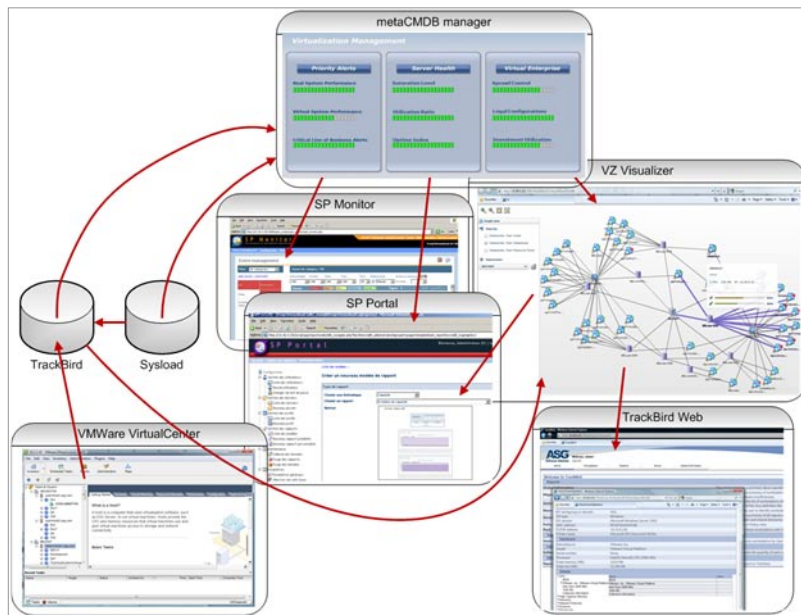


Figure 6: ASG BSP Virtualization Management Architecture Overview

As a result, ASG's solutions fill many of the gaps left by low-level virtualization management tools, allowing enterprises to achieve best practices as they deploy mission-critical production processes on virtual infrastructures, by giving operational, task-oriented administrators outside the virtualization project team the ability to answer real, everyday, operational questions, such as:

- **What do I have and where is it at?** Agentless discovery of virtual machines, and application dependency mapping, provide clear visibility into the entire environment, including host and guest environments, hardware specs, software deployments, and configuration of virtual machines, systems, and applications.
- **What is breaking down right now, who has been alerted, what is the root cause?** Granular, real-time measurement of over 350 different performance metrics from VMs, servers, databases, and applications gives administrators real-time visibility into performance and capacity issues, with sophisticated correlation and root cause analysis.
- **What is on the verge of breaking down tomorrow?** Collating long-term historical performance data and correlating it with capacity utilization, availability, and asset metrics allows IT administrators to forecast performance and utilization, and to migrate workloads *before* they experience performance problems.

Critically, given the complexity and heterogeneity of the typical virtualization deployment, ASG Business Service Management solutions integrate management of multiple virtualization platforms, technologies, and vendors, as well as multiple physical environments, all in the same solutions.

This is made even more accessible and actionable through ASG's Path to Optimization (PTO). This provides solutions to support organizations as they work to improve their maturity from silo-based infrastructure and operations management, through to true business-aligned service management. At the end point is a broad solution that integrates heterogeneous, cross-silo, physical and virtual systems management capabilities into a single view dashboard with drill-down capabilities for detailed insight and control – a highly desirable and practical approach to achieve next generation IT Infrastructure and Operations management that is aligned with business needs.

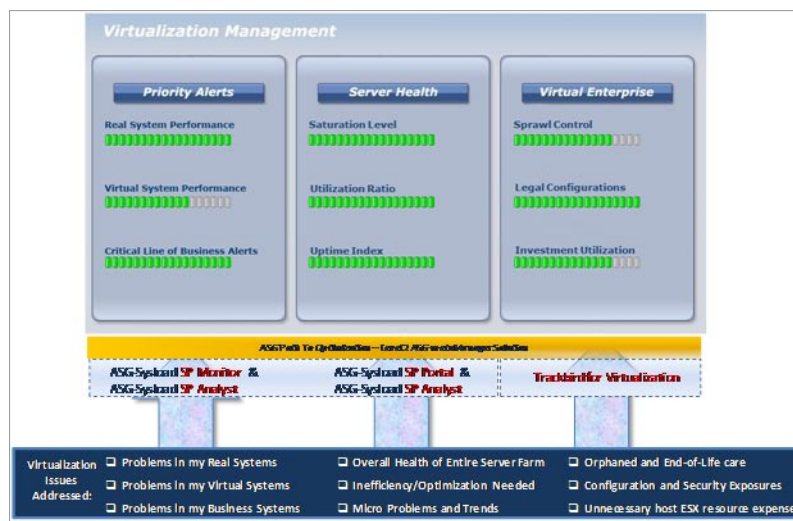


Figure 7: ASG-BSP Virtualization Management Business Level View

These capabilities directly address several of the challenges of virtualization. With broad performance and capacity metrics correlated with application dependency and configuration information, administrators can achieve business performance goals and outperform critical virtualization KPIs, while improving their own productivity, and reducing operational costs.

EMA Perspective

Considering the KPIs that EMA has measured, the potential benefits of virtualization are nothing short of amazing – fitting independent workloads that previously ran on 15 or more individual servers onto a single physical machine, ramping up administrator efficiency to handle twice the workload with the same staff levels, provisioning new systems 240 times faster than before, and resolving performance issues in seconds instead of hours. However, EMA data also shows that these results are not the norm, and that the average enterprise is actually well below these levels – and their business performance will suffer, especially if their competitors are among the best performers.

Sophisticated, integrated, heterogeneous, virtual systems management is a critical business differentiator.

This is why EMA believes that sophisticated, integrated, heterogeneous, virtual systems management is a critical business differentiator for enterprises as they deploy and expand their virtualization infrastructure.

ASG is providing these critical capabilities for monitoring business service performance in a complex, heterogeneous, physical and virtual environment. With a strong focus on business service management, leading technologies in service monitoring, and coverage for many physical and virtual technologies, there is no doubt that ASG's solutions will help enterprises achieve their VSM and business service management objectives. EMA therefore believes that ASG should be considered as a core contributor to a broad virtual systems management strategy.

About ASG

ASG provides Global 5000 businesses with world-class professional services and software solutions for Metadata Management, Applications Management, Operations Management, Content Management, Performance Management, Security Management, and Infrastructure Management. Through a wealth of technologies, which have been either developed in-house or gained through strategic acquisitions, ASG enables clients with both mainframe and distributed environments to mobilize their resources, boost productivity, and enhance performance through the intelligent use of technology. For more information visit www.asg.com.

About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that specializes in going “beyond the surface” to provide deep insight across the full spectrum of IT management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help its clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise IT professionals and IT vendors at www.enterprisemanagement.com or follow [EMA on Twitter](#).

This report in whole or in part may not be duplicated, reproduced, stored in a retrieval system or retransmitted without prior written permission of Enterprise Management Associates, Inc. All opinions and estimates herein constitute our judgement as of this date and are subject to change without notice. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. “EMA” and “Enterprise Management Associates” are trademarks of Enterprise Management Associates, Inc. in the United States and other countries.

©2009 Enterprise Management Associates, Inc. All Rights Reserved. EMA™, ENTERPRISE MANAGEMENT ASSOCIATES®, and the mobius symbol are registered trademarks or common-law trademarks of Enterprise Management Associates, Inc.

Corporate Headquarters:
5777 Central Avenue, Suite 105
Boulder, CO 80301
Phone: +1 303.543.9500
Fax: +1 303.543.7687
www.enterprisemanagement.com



1944.082709